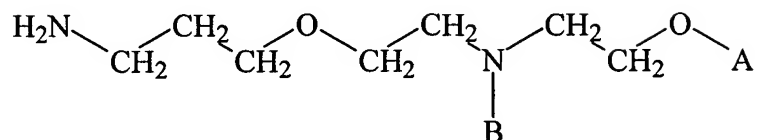


1 **WHAT IS CLAIMED IS:**

- 2 1. A composition comprising:  
 3 an aqueous based continuous phase; and  
 4 a shale hydration inhibition agent having the formula:  
 5



- 6  
 7 wherein A is independently selected from H and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and  
 8 wherein B is independently selected from H,  $\text{CH}_2\text{CH}_2\text{OH}$ ,  
 9  $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$  and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and  
 10 wherein the shale hydration inhibition agent is present in sufficient concentration  
 11 to reduce the swelling of shale.

- 12  
 13 2. The composition of claim 1 wherein the shale hydration inhibition agent is the  
 14 reaction product of a hydrogenation reaction of the product of the reaction of  
 15 triethanolamine and acrylonitrile

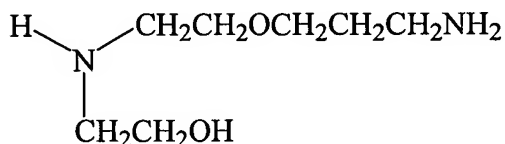
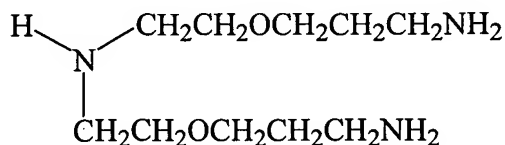
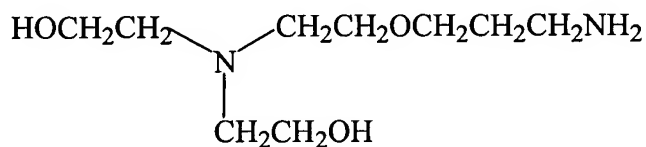
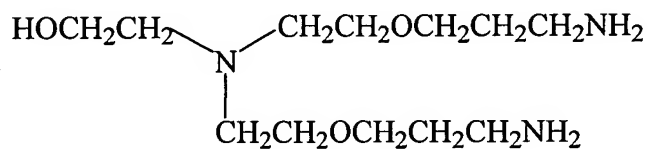
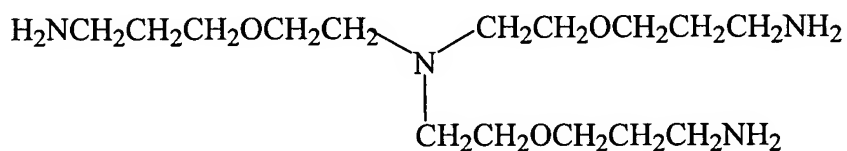
- 16  
 17 3. The composition of claim 1 wherein the shale hydration inhibition agent is the  
 18 reaction product of a hydrogenation reaction of the product of the reaction of  
 19 diethanolamine and acrylonitrile

- 20  
 21 4. The composition of claim 1 wherein the aqueous based continuous phase is  
 22 selected from: fresh water, sea water, brine, mixtures of water and water soluble organic  
 23 compounds and mixtures thereof.

- 24  
 25 5. The composition of claim 1 further comprising a viscosifying agent.  
 26

6. The composition of claim 1 further comprising a weighting material selected from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate, organic and inorganic salts, and mixtures thereof.

7. The composition of claim 1 wherein shale hydration inhibition agent is selected from:



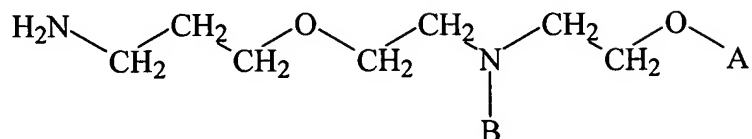
and mixtures of these.

8. A water-base drilling fluid for use in drilling a subterranean well through one or more subterranean formations containing a shale which swells in the presence of water, the drilling fluid comprising:

an aqueous based continuous phase;

a weighting agent; and

a shale hydration inhibition agent having the formula:



wherein A is independently selected from H and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

wherein B is independently selected from H,  $\text{CH}_2\text{CH}_2\text{OH}$ ,  $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$  and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

wherein the shale hydration inhibition agent is present in sufficient concentration to reduce the swelling of the shale.

9. The composition of claim 8 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of triethanolamine and acrylonitrile

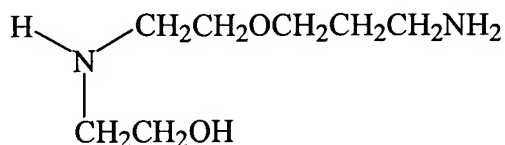
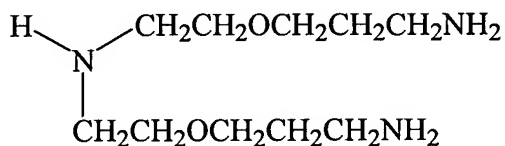
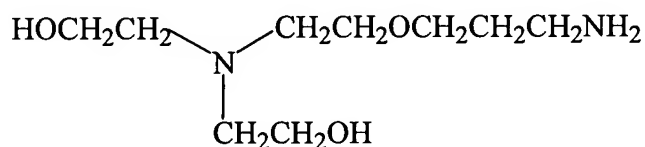
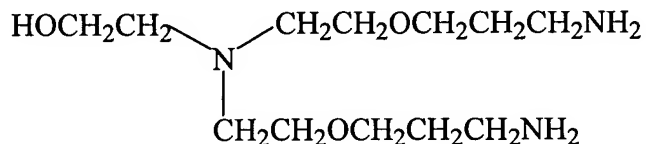
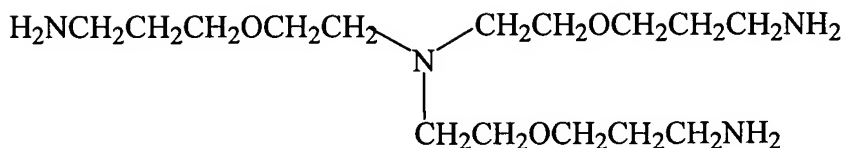
10. The composition of claim 8 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of diethanolamine and acrylonitrile

11. The composition of claim 8 wherein the aqueous based continuous phase is selected from: fresh water, sea water, brine, mixtures of water and water soluble organic compounds and mixtures thereof.

12. The composition of claim 8 further comprising a viscosifying agent .

13. The composition of claim 8 wherein the weighting agent is selected from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate, organic and inorganic salts, and mixtures thereof.

14. The composition of claim 8 wherein shale hydration inhibition agent is selected from:



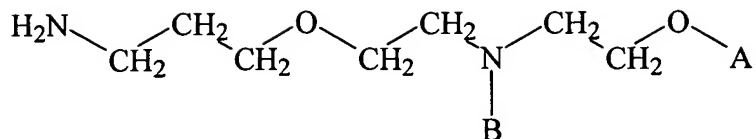
and mixtures of these.

15. A drilling fluid for use in drilling a subterranean well through one or more subterranean formations containing a shale which swells in the presence of water, the fluid comprising:

an aqueous based continuous phase;

a viscosifying agent and

a shale hydration inhibition agent having the formula:

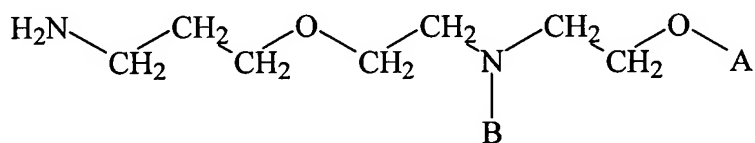


wherein A is independently selected from H and CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>; and  
 wherein B is independently selected from H, CH<sub>2</sub>CH<sub>2</sub>OH,  
 CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub> and CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>; and  
 wherein the shale hydration inhibition agent is present in sufficient concentration to  
 reduce the swelling of shale.

16. The composition of claim 15 further comprising a viscosifying agent.

17. The composition of claim 15 further comprising a weighting material selected  
 from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate,  
 organic and inorganic salts, and mixtures thereof.

18. A fracturing fluid for use in a subterranean well through one or more subterranean  
 formations containing a shale which swells in the presence of water, the fluid comprising:  
 an aqueous based continuous phase;  
 a viscosifying agent and  
 a shale hydration inhibition agent having the formula:



wherein A is independently selected from H and CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>; and  
 wherein B is independently selected from H, CH<sub>2</sub>CH<sub>2</sub>OH,  
 CH<sub>2</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub> and CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>; and  
 wherein the shale hydration inhibition agent is present in sufficient concentration  
 to reduce the swelling of shale.

19. The composition of claim 18 further comprising a viscosifying agent.

20. The composition of claim 18 further comprising a weighting material selected from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate, organic and inorganic salts, and mixtures thereof.

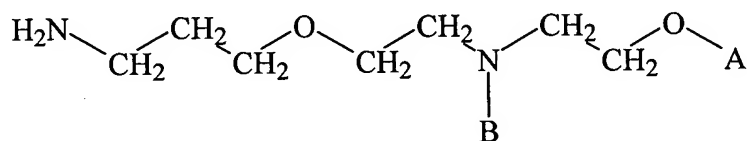
21. A method comprising

drilling a subterranean well through one or more subterranean formations containing a shale which swells in the presence of water, wherein the drilling is carried out using a drilling fluid including:

an aqueous based continuous phase;

a weighting agent; and

a shale hydration inhibition agent having the formula:



wherein A is independently selected from H and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

wherein B is independently selected from H,  $\text{CH}_2\text{CH}_2\text{OH}$ ,  $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$  and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

wherein the shale hydration inhibition agent is present in sufficient concentration to reduce the swelling of shale.

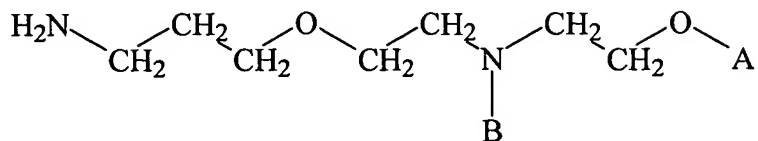
22. The method of claim 21 wherein the weighting agent is selected from the group consisting of barite, calcite, hematite, iron oxide, calcium carbonate, organic and inorganic salts, and mixtures thereof.

23. A composition comprising:

an aqueous based continuous phase;

a swellable shale material; and

a shale hydration inhibition agent having the formula:



wherein A is independently selected from H and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

wherein B is independently selected from H,  $\text{CH}_2\text{CH}_2\text{OH}$ ,  $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$  and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

wherein the shale hydration inhibition agent is present in sufficient concentration to reduce the swelling of the shale.

24. The composition of claim 23 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of triethanolamine and acrylonitrile

25. The composition of claim 23 wherein the shale hydration inhibition agent is the reaction product of a hydrogenation reaction of the product of the reaction of diethanolamine and acrylonitrile

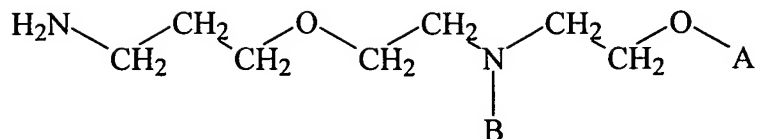
26. The composition of claim 23 wherein the aqueous based continuous phase is selected from: fresh water, sea water, brine, mixtures of water and water soluble organic compounds and mixtures thereof.

27. A method of disposing of drill cuttings into a subterranean formation, the method comprising:

grinding the drill cuttings in a water-base fluid to form a slurry, wherein the water based fluid includes:

an aqueous based continuous phase and

a shale hydration inhibition agent having the formula:



1

2

wherein A is independently selected from H and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

3

wherein B is independently selected from H,  $\text{CH}_2\text{CH}_2\text{OH}$ ,

4

$\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$  and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and

5

wherein the shale hydration inhibition agent is present in sufficient concentration to

6

reduce the swelling of shale, and

7

injecting the slurry into the subterranean formation.

8

9

28. The method of claim 27 wherein the shale hydration inhibition agent is the

10

reaction product of a hydrogenation reaction of the product of the reaction of

11

triethanolamine and acrylonitrile

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13

29. The method of claim 27 wherein the shale hydration inhibition agent is the

14

reaction product of a hydrogenation reaction of the product of the reaction of

15

diethanolamine and acrylonitrile

16

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30. The method of claim 27 wherein the aqueous based continuous phase is selected

18

from: fresh water, sea water, brine, mixtures of water and water soluble organic

19

compounds and mixtures thereof.

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21

31. A method of reducing the swelling of shale clay in a well comprising circulating

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in the well a water-base drilling fluid comprising:

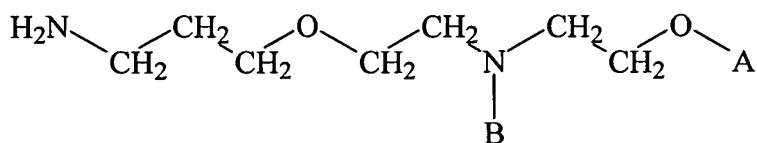
23

an aqueous based continuous phase and

24

a shale hydration inhibition agent having the formula:

25



26



1           wherein A is independently selected from H and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and  
2           wherein B is independently selected from H,  $\text{CH}_2\text{CH}_2\text{OH}$ ,  
3            $\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_2\text{NH}_2$  and  $\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ ; and  
4           wherein the shale hydration inhibition agent is present in sufficient concentration  
5 to reduce the swelling of the shale.

6

7   32.   The method of claim 31 wherein the shale hydration inhibition agent is the  
8 reaction product of a hydrogenation reaction of the product of the reaction of  
9 triethanolamine and acrylonitrile

10

11   33.   The method of claim 31 wherein the shale hydration inhibition agent is the  
12 reaction product of a hydrogenation reaction of the product of the reaction of  
13 diethanolamine and acrylonitrile

14

15   34.   The method of claim 31 wherein the aqueous based continuous phase is selected  
16 from: fresh water, sea water, brine, mixtures of water and water soluble organic  
17 compounds and mixtures thereof.

18

19

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